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The Administered-Price Hypothesis and the Canadian Economy

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THE ADMINISTERED-PRICE HYPOTHESIS AND THE CANADIAN ECONOMY

1 Introduction and Summary

This paper is a companion piece to an earlier one, Stuber (1984), and continues to consider the question of the degree of competition and its implications for price adjustment and inflation in the Canadian economy. The ability of a firm or an industry to exert market power admittedly affects only its own relative price. Nevertheless, an ongoing change in the extent of diffusion of market power in an economy can affect price levels over time and hence inflation. In addition, although no clear link has been established between relative price inflexibility and absolute price level or inflation inertia, investigation of hypotheses of one or the other may eventually clarify our understanding of these mechanisms and reasons for them.

I began by reviewing the literature on administered pricing. The roots of this literature were in an empirical observation by Gardiner Means that some industrial prices remained at constant levels for extended periods, even during the Great Depression. This observation was subjected to the criticism that the statistical data employed by Means reflected quoted prices rather than transactions prices. Over time, the notion of administered pricing came to be associated with the idea that prices would be less cyclically sensitive in more concentrated industries. A number of justifications have been made for sticky prices. For example, oligopolistic firms may have the objective of long-run rather than short-run profit maximization and the concurrent problem of coordinating their prices with one another. For a goods-supplying, imperfectly competitive firm, changes in cost and demand functions over time (leading to holding of inventories) may also reduce price flexibility. As well, high transactions costs may lead to long-term relationships between customers and suppliers based on stable pricing policies.

An examination of recent data did not reveal any strong trends in industrial concentration in Canada. Construction of price indices according to concentration levels suggested that prices may have been less cyclically volatile in medium-concentration manufacturing industries. A review of the empirical literature indicates limited, though not definitive, evidence for the administered-pricing hypothesis.

I next examined the results of a number of econometric tests of hypotheses associated with the idea of administered pricing. Cross-sectional regressions for various manufacturing industries were

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estimated. In the most basic form of the pricing equation, the percentage change in price is a function of the percentage change in normalized direct unit costs, the difference between the actual and sample-average capacity utilization rate (excess demand proxy) and the difference between the actual and cross-sectional concentration rate (relative concentration rate). According to a standard variant of the administered-pricing hypothesis, one would expect the coefficient of the concentration-rate variable to be positive during recessions and the early stages of a recovery and negative in the later part of a cyclical expansion. It was found that the coefficient of the cost variable tended to be larger near the peak of the business cycle. Surprisingly, the coefficient of the excess-demand proxy variable was always negative. The coefficient of the concentration ratio was generally statistically insignificant and it was difficult to find a consistent cyclical sign pattern. These results did not provide strong support for the above version of the administered-pricing hypothesis. The addition of explanatory variables for import penetration and export orientation made little difference. The manufacturing sector was also partitioned into three groups according to concentration-rate levels. There did not appear to be any consistent differences in the cyclical sign pattern of the unit-cost variable among the three concentration groupings. A separate pricing equation was estimated in which the variable for the capacity utilization rate was replaced by the variable for percentage change in gross output. Support was found (not found) for the predictions of Phlips (1980, 1983) that the coefficient of the cost ("demand") variable would be larger (smaller) in less concentrated industries. Finally, the manufacturing sector was also partitioned between industries producing tradeable and non-tradeable goods, but no discernible differences in the pricing equations of the two industry groupings were evident.

The cyclical sensitivity of profit margins in the manufacturing sector was also examined, with a view to testing the hypothesis that profit margins would be more cyclically stable in more concentrated industries. Use of the approach of Pulling (1978) provided weak evidence for this hypothesis. Conversely, when cross-sectional regressions were estimated with profit margins as a function of the excess-demand proxy variable, the relative concentration rate and the lagged profit margin, I could find no support for the above hypothesis. In this case, the coefficient of the excess-demand proxy variable was positive. Partitioning of the manufacturing sector into three groups according to concentration levels did not provide evidence for administered pricing, although there was weak evidence that profit margins on average may be more responsive to capacity utilization rates in highly concentrated industries. In general, the econometric tests undertaken thus far do not support the ideas that either prices or profit margins are more cyclically stable in more concentrated industries.

2 A Review of the Literature on Administered Pricing and Some Microeconomic Rationales for Sticky Prices[1]

Gardiner Means[2] was among the first to argue that rigidity in price formation could be significant in explaining aggregate price inflation. During the Great Depression of the 1930s, he observed an apparent wide disparity in the responsiveness of the prices of various goods to reductions in demand. For example, there were huge declines in the prices of most raw materials in the United States between 1929 and 1932. At the same time, prices of other (generally more processed) goods (e.g., agricultural machinery, iron ore, hand tools, plate glass) fell only slightly. He found that the prices of many of these latter commodities shared two characteristics: they were set by sellers and held constant for a considerable time (hence the term "administered price"). In Means' early work, he distinguished between administered and market-dominated prices according to the frequency of price change; i.e., the more infrequent were changes in the price of a particular commodity, the more that price could be characterized as "administered". Of course, if the amplitude of changes in administered prices was as large as that for market-dominated prices over a given period (in response, say, to comparable demand shocks), even though less frequent, this phenomenon would be less interesting. However, Means found that during the 1930s the movements in prices characterized as administered were much smaller than movements in market-dominated prices (see Chart 1-II of Means, 1975, p. 9). At the same time, industries with relatively small declines in prices between 1929 and 1932 tended to have relatively large decreases in output, suggesting that firms that administered prices were more likely to respond to changes in demand by adjusting output than by changing price. This early work was criticized primarily on two grounds.[3] No theoretical reason was given for the existence of administered pricing. As well, Means used wholesale price indices, which did not necessarily reflect actual transactions prices (i.e., allow for discounts and premiums).

In more recent work, Means turned his attention to the question of what he termed "administrative inflation", in which price inflation could occur regardless of the cyclical position of the economy, suggesting that this could arise from either industrial concentration (profit-push argument) or unionization (cost-push argument). For instance, he found that the rate of increase in wholesale prices between 1953 and 1958 in the United States appeared to bear some positive correlation to the degree of industrial concentration (see Chart 1-III of Means, 1975, p. 13).

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1. The discussion of the administered-pricing hypothesis in Scherer (1980) was used in compiling this review.

2. A recent statement of his ideas is given in Means (1975).

3. I have followed the brief discussion in Kahn (1975).

The proposition that some industrial prices were virtually unresponsive to cyclical conditions was tested by Stigler and Kindahl (1970). Data were collected on transactions prices for selected commodities for which past pricing behaviour had been considered administered. The direction of price change during two recessions and expansions in the United States was analyzed and compared to similar wholesale price indices. It was found that transactions prices were much more responsive to cyclical conditions than quoted prices, and the authors concluded that there was no significant evidence for the phenomenon of price rigidity.[4]

Basic micro theory may be used to illustrate some cases in which market structure may have some influence on the degree of cyclical flexibility of prices. Kahn (1975) suggests a situation that may be relatively applicable in the real world; i.e., the supply curve of competitive industries may be very price elastic at low levels of capacity utilization and highly inelastic at very high levels of capacity utilization. If the industry was operating at full physical capacity (so that supply was completely price inelastic), then the competitive and (equivalent) monopoly prices would be the same. A large leftward shift of the industry demand curve would result in a sizeable decline in the equilibrium competitive price, as the industry moved down the inelastic portion of its supply curve. On the other hand, an equivalent monopoly firm, faced with an equivalent shift in its demand curve, would maintain price at a higher level than the competitive industry through a larger reduction in output.[5]

Other rationalizations can be introduced for cyclically insensitive prices in more concentrated industries, many of which involve long-run profit maximization rather than efforts to maximize profits in each period with no thought for future consequences. It has long been believed that oligopolies by nature have inherent difficulties with pricing coordination.[6] Each oligopolistic firm, after taking account of the reaction of rival firms, may find it best to follow a conventional pricing rule (such as a markup on standard unit costs) understood by all firms in the industry. Firms may also set prices so as to discourage entry by new firms ("limit pricing"). Given that new-firm entry is likely to be easier in the expansion phase of the cycle, existing firms would have an incentive (less incentive) to reduce prices (relative to firms in a comparable competitive industry) in the upswing (downswing), thus promoting cyclical price stability.

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4. The mini-debate generated by this study indicated a fundamental disagreement over the meaning of the administered-pricing hypothesis (Means, 1972 and Stigler and Kindahl, 1973).

5. Constant price elasticity of the industry supply and demand curve are crucial assumptions in showing that the relative gap between the monopoly and competitive price would not change with movements in the demand curve. For a demonstration, see Moore and Levy (1955).

6. Qualls (1979) has been useful in the following discussion.

Qualls (1979) has raised some doubts as to the reliability of these justifications for price rigidity. Pricing coordination may be more difficult in oligopolies with lower concentration levels, so that markups might be more cyclically sensitive at higher concentration levels.[7],[8] In regard to the limit-pricing argument, the point is made that most of these models are concerned with long-run rather than short-run behaviour.

Okun (1981) has developed another rationale for price stickiness. High transactions costs may make it logical for customers to establish long-term relationships with a given supplier. In markets with differentiated products, aspects of the commodity such as quality may be more important than price. Customers may prefer to deal with firms using stable pricing policies. Okun suggests that oligopolistic firms may for instance be reluctant to raise prices in the face of a rise in demand less because they fear the reaction of rival firms than because of the potential permanent loss of established customers.

Phlips (1980, 1983) has presented a further argument for the phenomenon of sticky prices. Inventories appear to play a fundamental role. One must first ask why firms would want to hold stocks of finished goods, breaking the direct link between production and sales. For perfectly competitive firms, uncertainty about future demand seems to be the crucial factor. Imperfectly competitive firms have some control over both price and production. Changes in demand and cost functions over time, even if known with certainty, provide a rationale for such firms to hold inventories. For instance, if costs and prices are increasing over time, it may be profitable to build up stocks in the early part of the planning period and then meet part of sales from inventories in the later part of the period. If the level of inventories is constrained to be constant between the beginning and end of the planning period, then it turns out that discounted marginal revenues and discounted marginal costs must be equal and constant throughout the planning period in order to maximize profits. The parallel to the rule of equating marginal revenue to marginal costs in each period in order to maximize profits is clear. Phlips also draws an analogy to the rule of normalized unit-cost pricing which is so popular in the empirical price literature.

Phlips then develops a pricing rule for an industry where firms follow the above type of pricing behaviour. If the industry demand curve is linear and entry is not possible, then the industry price is a "linear function of the intercept (α) of the industry's demand curve and the average normalized marginal cost" (Phlips, 1983, p. 97).[9] The parameters

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7. Qualls adds the qualification that this is more likely to be true for normal swings in demand.

8. Pricing coordination during recessions may also be more difficult in industries characterized by high fixed costs (Scherer, 1980).

9. If entry is possible, then the price equation also includes a term for the marginal cost of entry.

of the explanatory variables depend on the number of firms. For a given level of concentration, changes in demand have much less impact on prices than do changes in average marginal costs. On the other hand, prices are more (less) sensitive to changes in demand (unit costs) in more concentrated industries. Phlips has suggested that empirical price equations should not include the concentration ratio as an additional explanatory variable but rather should partition cross-sectional data according to concentration ratio ranges. In some work with cross-sectional European data, the above hypotheses were not rejected by the data.

3 Industrial Concentration and Inflation -- Empirical Evidence

I begin by briefly reviewing recent developments in industrial concentration in Canada. On an economy-wide basis, there was little change in concentration ratios between 1975 and 1980 when measured in terms of sales (Table 1). There is, however, a tendency towards more concentration when measured in terms of assets and especially in terms of equity and profits. Disaggregated data on sales concentration ratios are shown in Table 2 for the 1975-80 period. Concentration ratios tend to be very high in many of what are conventionally considered capital intensive industries: oil and coal products, communication, primary metals and metal mining. Concentration rates are generally much lower in the service, construction and non-durables manufacturing industries.

For an analysis of pricing behaviour, it would be preferable to work with even more disaggregated data, which are published at the three-digit level for the manufacturing, logging and most of the mining sector in Statistics Canada (1983).[10] The average level of concentration (using four-firm concentration ratios) in the manufacturing sector has not changed very much over the 1970-80 period, whether measured on an enterprise or an establishment basis. The distribution of four-firm concentration ratios in the manufacturing sector was also essentially unchanged, with the exception of an increase in the share of industries in the 59%-74.9% range and a decline in the 75%-100% range. Among individual industries, one of the largest increases was in publishing and printing (from 37.6% in 1970 to 57.1% in 1980), while one of the largest decreases was in the petroleum and coal products group (from 78.6% in 1970 to 61.7% in 1980). Some limitations on the use of these data as measures of concentration in distinct markets should be noted. Imports are not included in measuring the size of the domestic market,[11] while exports are included in measuring concentration. Transport costs and other possible trade barriers may make it important to look at regional concentration ratios.

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10. This publication is used for the discussion in the remainder of this paragraph.

11. Trends in import penetration have been examined in Stuber (1984).

I have used the data in Statistics Canada (1983) to classify selected manufacturing industries[12] into three concentration groups: low (0%-39.9%), medium (40%-59.9%) and high (60%-100%). In cases where four-firm concentration ratios crossed group boundaries during the 1970-80 period, judgment was used for classification, generally based on the grouping to which the industry belonged for the majority of the period. A listing of industries is given in Table 3.

Aggregate price indices were constructed for these three industry groupings, with net output weights.[13] The results are shown for the 1972-82 period in Table 4 and in Charts 1 and 2. The data suggest that prices have been somewhat less volatile in the medium-concentration industry grouping. The highest degree of price variability is evident in the high-concentration grouping over the period as a whole, although the differences between the low-concentration and high-concentration groupings were rather small over the 1972-79 period. Distortions in making comparisons may have been introduced by the effects of the commodity price boom and the oil price shocks of 1973-74 and 1979 on different manufacturing industries. Short-term movements in output for the above three industry groupings are shown in Chart 3. Cyclical changes in production tended to be largest for the high concentration grouping, which might help explain its price variability. Weighted profit margins[14] were also calculated for the 1972-80 period, as shown in Chart 4. Over the period under review, there were no really discernible major differences in fluctuations in profit margins among the three industry groupings.

I now turn to a brief review of the literature on empirical tests of the administered pricing hypothesis.[15] One empirical approach has been to use multiple regressions where price changes were a function of changes in unit costs and in demand, as well as concentration ratios. This kind of research has suggested that price changes tend to be less cyclically sensitive in more concentrated industries and in particular that the lags in the pass-through of costs were longer for more concentrated industries. An alternative approach examined the relationship between price-variable cost margins and concentration ratios. Earlier work suggested that these margins remained more stable in recessions for more concentrated industries. Wachtel and Adelsheim (1976) provided some

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12. For this exercise, only those manufacturing industries were included for which published (and generally more reliable) output data were available. In 1982, these industries accounted for about 74% of total manufacturing output.

13. Industry-selling-price indices were used where available. In a few cases, gross-output-price indices were employed, supplemented by proxy growth rates for 1982.

14. Profit margins were defined as the ratio of net profit before direct taxes to total income. Data were taken from Statistics Canada, Corporation Financial Statistics (61-207).

15. I again follow the discussion in Scherer (1980).

descriptive evidence for this hypothesis (although I did not find the material presented completely compelling). On the other hand, Qualls (1979) found a positive relationship between the cyclical variability of price-variable cost margins and concentration ratios. Dixon (1983) examined the speed of adjustment of prices to unit costs in various Australian manufacturing industries. He found that the speed of price adjustment was negatively correlated with the length of the production period and positively correlated with the import share. The price-adjustment speed was negatively related to the concentration ratio and positively related to the number of firms (an inverse interdependency proxy). Chappell and Addison (1983) estimated the rate of change of prices of industries grouped according to concentration levels as a function of past rates of change in the money supply. They found little evidence that the responsiveness of prices to changes in the money supply was noticeably slower in more concentrated industries. Neumann, Böbel and Haid (1983) found that the effect of concentration on price-cost margins was positive among selected West German manufacturing companies; the impact of concentration was also larger during cyclical expansions. However, they did not control for differences in capacity utilization rates in their empirical analysis.

I will also discuss some Canadian studies of the relationship between concentration ratios and price levels/inflation rates. Sellekaerts and Lesage (1973) reported that the impact of concentration ratios on price inflation for selected manufacturing industries varied with the stage of the business cycle. Inflation rates tended to be higher in more concentrated industries in the initial recovery period of an expansion. Firms in more concentrated industries were viewed as raising prices in order to restore profit margins to more normal levels ("catching-up hypothesis"). When capacity utilization rates in the economy were high, the coefficient on the concentration-measure variable tended to be negative, as expected; however, the coefficient was not statistically significant.[16] Lack of reliable data precluded testing of the administered-pricing hypothesis during major recessions ("Means-Galbraith" hypothesis). De Silva (1971) was unable to find a statistically significant relationship between inflation rates and concentration ratios for selected manufacturing industries during the 1961-67 period. Jones and Laudadio (1977) have also tested the administered pricing hypothesis over the 1958-69 period. Explanatory variables in their cross-sectional price equations included output and costs changes, concentration ratios and (most uniquely) a dummy variable for import penetration. The

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16. Sellekaerts and Lesage termed this the Galbraith-Ackley hypothesis, based on Ackley (1959) and Galbraith (1957). Galbraith in his article brought up arguments related to pricing coordination problems among oligopolistic firms and long-run profit maximization (customer relations and potential entry of new firms) as justifications for a substantial lag in the response of oligopolistic prices to shifts in demand curves.

coefficient on the concentration ratio variable was in accord with expectations and was statistically significant both in periods of generally weak demand (1958-61) and generally strong demand (1965-69).

I have undertaken some econometric tests of hypotheses associated with the idea of administered pricing. A database for 122 manufacturing industries was constructed for the 1961-79 period using annual input-output data from Statistics Canada. A special effort was made to construct capacity utilization rates as a more reliable measure of excess demand.[17]

The most basic form of the pricing equation estimated was as follows:

$$\%\Delta P = a + b*\%\Delta NUC + c*(CAPU-CAPUAV) + d*(CR-CRAV), \qquad (1)$$

where P = the gross output price level,
NUC = normalized unit costs,[18]
CAPU = the capacity utilization rate,
CAPUAV = the average CAPU over the sample period for a given industry,
CR = the four-firm concentration ratio,
and CRAV = the average CR across industries.

NUC was constructed as an admittedly crude proxy for normalized unit costs. The inclusion of a measure of capacity utilization is a definite improvement over many other studies, which have used crude proxies such as the change in output. Another concern that I have had with a number of other studies is that the change in price has been calculated over a relatively long period, such as more than two years. It seems to me that many of these studies are really testing propositions about long-run pricing behaviour and not the administered-pricing hypothesis.[19] The approach taken by both Lustgarten (1975) and Encaoua (1983) in treating price changes over much shorter periods (say one or two years) appears more appropriate. One criticism of the approach shown by equation (1) is that one should really look at changes in relative prices.

Cross-sectional regressions with the annual percentage change in the price as the explanatory variable were estimated for each year between 1965 and 1979. One would expect both coefficients a and b to be positive. The coefficient of the concentration ratio variable would be expected to be positive in recessions and in the early phase of the recovery (1967-68, 1970-71, 1975-77) and negative in other years. Regression results are shown in Table 5.

The coefficient of the normalized unit cost variable was generally highly statistically significant and also tended to be larger near the

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17. For more details, see Appendix 1.

18. Costs included labour income, as well as the cost of energy and raw material inputs. Normal output was defined as a three-year moving average of gross output. Normalized unit costs were defined as the ratio of costs to normal output.

19. This point has also been made by Weiss (1977).

peak of the business cycle. Surprisingly, the coefficient on the excess-demand proxy variable was always negative and sometimes statistically significant.[20] However, the coefficient of the concentration ratio variable was almost always statistically insignificant. The sign of the coefficient was often positive in periods of relatively low aggregate capacity utilization. There was no such consistent pattern during periods of high aggregate capacity utilization. These results do not provide strong support for the administered pricing hypothesis.[21]

As noted by Jones and Laudadio (1977), the relatively open nature of the Canadian economy makes it important to account for the impact of foreign competition on pricing behaviour. Ideally one would wish to make adjustments to the concentration ratio data to include imports, exclude exports and account for the largest firms (whether domestic or foreign producers) making sales in the Canadian market. Marfels (1979) has made estimates of four-firm concentration ratios adjusted for foreign trade for various manufacturing industries for 1965, 1968 and 1970. However, even his estimates did not take account of large foreign producers making sales in the Canadian market nor did he have explicit information on the breakdown of domestic and foreign sales of Canadian producers. Jones and Laudadio (1977) and Encaoua (1983) have added an additional explanatory variable to the pricing equation to help account for import competition. Jones and Laudadio (1977) suggest a negative relationship between the rate of price increase and the level of foreign competition. Encaoua (1983) has suggested that this may not be so if the imports are controlled by domestic producers.[22] I have some trouble with the proposition that the relationship should always be negative. There may well be a negative relationship between the price level and the level of foreign competition but higher levels of foreign competition should make short-run pricing behaviour more similar to that of highly competitive industries. I would suggest that the coefficient of the foreign competition variable should be negative in recessions and in the early parts of recoveries and positive at high levels of aggregate capacity utilization, offsetting at least part of the effect of administered-pricing behaviour as represented by the concentration ratio variable.

Jones and Laudadio (1977) found that the coefficient on an import-penetration variable was statistically insignificant and instead used dummy variables for moderate and high levels of import penetration. The

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20. The negative coefficient on the excess-demand variable is extremely puzzling. When a scatter diagram between price inflation and excess demand for 1979 was examined, several outliers were found that were probably responsible for the negative relationship. Factors such as strikes and supply shocks might lead to such a spurious relationship.

21. Lustgarten (1975), working with U.S. data and using a similar approach, came to similar conclusions.

22. Jarrett (1979, Chapter 5) found some support for the hypothesis of a negative relationship between profit rates and arms-length imports only.

coefficients of the import-penetration variables were statistically insignificant for the 1958-61 period but negative (and also statistically significant in the case of the high import-penetration variable) for the 1965-69 period. Any conclusions regarding short-run pricing behaviour would appear vitiated by the choice of time period. Encaoua (1983) found that the coefficient of the import-penetration variable was negative and statistically significant in two expansionary periods (1971-73 and 1976-78).

I included the rate of import penetration (RI) as an additional explanatory variable in the pricing equation:

$$\%\Delta P = a + b*\%\Delta NUC + c*(CAPU-CAPUAV) + d*(CR-CRAV) + e*(RI-RIAV), \quad (2)$$

where RIAV = the average RI across industries.

Cross-sectional regressions for each year over the 1964-79 period were estimated. The coefficient on the import-penetration variable was generally statistically insignificant. However, the coefficient did tend to be positive during recessions and the early part of a recovery and negative during most of an expansion; this latter finding supports that of Encaoua (1983) (though not my prior expectations). The inclusion of an import-penetration variable generally had little effect on the sign and size of the coefficients of the other explanatory variables in the equation.

Encaoua (1983) has also included an export-orientation variable in his cross-sectional price equations. He found that the coefficient of the export-orientation variable was positive in the 1971-73 and 1976-78 expansions and negative in the 1974-75 recession. In my view, export-oriented industries would tend to have much less control over their product price than would closed industries, other things being equal; administered-pricing behaviour would be much less likely in such industries and might be one explanation for the sign pattern observed above. The rate of export orientation (RXϕ) was included as a further explanatory variable in another version of the pricing equation:

$$\%\Delta P = a + b*\%\Delta NUC + c*(CAPU-CAPUAV) + d*(CR-CRAV) + e*(RI-RIAV) + f*(RX\phi-RX\phi AV), \quad (3)$$

where RXϕAV = the average RXϕ across industries.

Cross-sectional regressions for each year over the 1964-79 period were estimated. The coefficient on the export-orientation variable was generally statistically insignificant, and it was also difficult to observe a consistent sign pattern during recessions and expansions. The cyclical sign pattern of the import-penetration variable was less clear-cut than before. On the other hand, the coefficients of the other explanatory variables were comparatively unchanged.

I next partitioned a selection of manufacturing industries according to the average four-firm concentration ratio level over the 1961-79 period. Three groups were established: low concentration (less than 40%), medium concentration (40%-59.9%) and high concentration (more than 60%). Some industries were excluded because of very low ratios of inventories to shipments.[23] The pricing equation was specified as follows:

$$\%\Delta P = a + b*\%\Delta NUC + c*(CAPU-CAPUAV). \qquad (4)$$

Annual cross-sectional regressions for each concentration grouping were estimated for each year over the 1964-79 period, with the results shown in Table 6. The coefficient on the normalized unit cost variable tended to be larger in the low-concentration grouping, which may be partly due to a lower level of capital intensity among industries with low concentration levels. As in previous cross-sectional work in this paper, there was a chronic problem with negative signs for the coefficient of the excess-demand proxy variable. The previous finding that the coefficient of the cost variable tended to be larger in the later stages of the expansion phase of the cycle was also repeated. There did not, however, appear to be any consistent differences in the cyclical pattern of the unit cost variable among the three concentration groupings.

I also estimated a form of the pricing equation that is very similar to the approach used by Phlips (1983). A selection of manufacturing industries was partitioned into three groupings according to concentration levels in the same manner as before. Since the explanation of sticky prices developed by Phlips depended so heavily on the presence of inventories as an influence on firm behaviour, I deliberately excluded industries with very low inventory-shipments ratios. The pricing equation took the following form:

$$\%\Delta P = a*\%\Delta NUC + b*\%\Delta Q, \qquad (5)$$

where Q = real gross output.

It is important to remember that the change in gross output is supposed to be a proxy for the change in the intercept in the industry demand curve and not a proxy for excess demand, so that an equilibrium model of pricing behaviour is being tested. In empirical practice, the percentage change in gross output may of course reflect shifts in both demand and supply curves over time.

On average the coefficient of the cost variable did tend to be larger in less concentrated industries, which was consistent with the theory and findings of Phlips. For individual years, this finding was more evident

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23. A list of industries included in each concentration grouping is given in Appendix 2.

after 1967. However, the coefficient of the gross output variable was almost always negative, indicating the inappropriateness of using gross output as a proxy for the intercept of the industry demand curve. In Phlips' empirical work, the coefficient of the demand curve, though generally positive, was almost always statistically insignificant. It is also worth noting that he tested his theory on only a fairly limited sample of manufacturing industries in Belgium, the Netherlands and France (Phlips, 1971).

Manufacturing industries were also classified between tradeable and non-tradeable goods sectors, using the criteria discussed in the section on regulation. Pricing equations of the following form were also estimated:

$$\%\Delta P = a + b*\%\Delta NUC + c*(CAPU-CAPUAV) + d*(CR-CRAV). \qquad (6)$$

Annual cross-sectional regressions for each year over the 1964-79 period were estimated. I would have expected confirmation of the administered-pricing hypothesis to be more likely in the non-tradeable goods sector, given that tradeable goods industries would more probably be price takers (of a world price) and/or exposed to foreign competition. On average the size of the coefficients of the normalized unit cost variable was very similar for the two sectors. I was unable to discern any significant difference in the cyclical pattern of the coefficients of the unit cost variable between the two sectors. The sign of the excess-demand proxy variable was again almost always perverse. The coefficient of the concentration ratio variable was often negative in the expansion phase of the business cycle in the tradeable goods sector. However, one would have expected this prediction of the administered-pricing hypothesis to be more evident in the non-tradeable goods sector. As well, the coefficient of the concentration ratio variable was almost always statistically insignificant.

4 Cyclical Behaviour of Profit Margins and Concentration Levels

In an application of the administered-pricing hypothesis, Pulling (1978) has suggested that profit margins would also be characterized by greater cyclical stability in more concentrated industries. I have used a methodology similar to that of Pulling as an initial test of this hypothesis.

Statistics Canada unadjusted industrial corporation financial data[24] were used to measure profit margins. Four business cycles were examined,

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24. Profits were defined as base profits less depreciation, employing the terminology used in Statistics Canada, Industrial Corporations. Financial Statistics. There are some breaks in the series owing to changes in the sample of corporations being surveyed (the most notable occur in 1974 and 1977); links were made at the Bank of Canada.

using the following cycle dates for troughs: 1962Q1-1968Q1,[25] 1968Q1-1970Q4, 1970Q4-1975Q1, and 1975Q1-1982Q4. In each cycle, time-trend regressions of the form PM=A+B*T were estimated for each profit margin series. The "cycle relative" series was then defined to be the ratio of the actual profit margin series and the simulated time-trend regression series.[26] The expansion amplitude was defined to be the difference between the cycle relative at the initial trough of the cycle and the peak cycle relative of the profit margin series, while the contraction amplitude was defined to be the difference between the peak cycle relative and the cycle relative at the final trough of the cycle. Weighted four-firm concentration ratios (CR)[27] were calculated for each manufacturing industry grouping. Data on concentration ratios and expansion (EA) and contraction amplitudes (CA) for the four business cycles and selected manufacturing industry groupings are available in Stuber (1984).

For each business cycle, linear regressions of the form

$$EA \text{ (or } CA) = C + D*CR$$

were estimated. If the hypothesis mentioned at the beginning of this section is correct, one would expect the coefficient D to be negative in expansion amplitudes and positive in contraction amplitudes. In nearly all cases, this turned out to be true (except for the contraction amplitude in the 1968-70 cycle), as indicated in Table 7. However, unlike Pulling (1978), the coefficient turned out to be statistically insignificant in all cases.

Average cycle amplitudes were also calculated for three industry groupings disaggregated according to degree of concentration: less than 40%, 40%-60% and more than 60%. In many cases, the expansion and contraction amplitudes were smaller in industries with concentration ratios higher than 60%[28] (Table 8). However, the magnitude of the expansion (and contraction) amplitudes tended to be comparable for the other industry groupings.

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25. The initial trough date was specified to be 1962Q1 instead of 1961Q1 because of data availability.

26. Pulling (1978) following Burns and Mitchell divided each business cycle for each profit margin series into nine stages. The cycle relative was then the ratio of the value of each series in each stage of the cycle to the average value of the series over the cycle.

27. The basic data source was Statistics Canada, Industrial Organization and Concentration in the Manufacturing, Mining and Logging Industries - 1980 (31-402). Aggregation was done at the Bank of Canada using real net output weights.

28. The exceptions were the 1962-68 expansion amplitude and the 1975-82 contraction amplitude.

There is, hence, some very weak evidence for a relationship between concentration levels and the cyclical sensitivity of profit margins. However, the above methodology is flawed by a lack of control for other possible explanatory variables, such as capacity utilization rates and foreign competition.

Cross-sectional profit margin regressions for each year of the 1962-79 period were also estimated, using the following equation form:

$$PRM = a + b*(CAPU-CAPUAV) + c*(CR-CRAV) + d*J1L(PRM), \qquad (7)$$

where PRM = the industry profit margin, defined in the same manner as in the regulation section.

Only manufacturing industries were included in the sample this time. Estimation results are shown in Table 9.

The coefficient on the excess-demand proxy variable was always positive and often statistically significant, in contrast to the cross-sectional price regressions. The value of the coefficient was generally larger in the later stages of an expansion and in recessions. However, the coefficient of the concentration ratio variable was almost always statistically insignificant. As well, I could not discern a consistent cyclical pattern in the signs of the coefficient, giving no support to the version of the administered-pricing hypothesis indicating that profit margins should be more cyclically stable in more concentrated industries.

Cross-sectional regressions were also estimated that included import penetration and both import-penetration and export-orientation variables. The results were generally qualitatively very similar to the previous evidence (detailed results are available in Stuber, 1984).

Finally, cross-sectional regressions were estimated for each of the three groups of manufacturing industries classified according to concentration levels. The form of the equation was as follows:

$$PRM = a + b*(CAPU-CAPUAV) + c*J1L(PRM). \qquad (8)$$

I expected the size of the coefficient of the excess-demand proxy variable to be larger in less concentrated industries. The results did not support this hypothesis. On average the size of this coefficient was somewhat larger in the high-concentration grouping than in either of the other two groupings. As well, there were many instances where the coefficient was statistically insignificant and some cases (for the low- and medium-concentration groupings) where the sign was negative.

Appendix 1
Data Sources

The basic set of data were derived from a set of input-output matrices supplied by Statistics Canada. These annual data covered the 1961-79 period and were disaggregated into 191 industries. The matrices included industry-by-industry use and industry-by-final-demand tables. More information on Statistics Canada's annual input-output tables can be found in Statistics Canada, The Input-Output Structure of the Canadian Economy (15-201) and The Input-Output Structure of the Canadian Economy in Constant Prices (15-202).

The gross output price deflator was used as the price variable. Costs (measured in current dollars) included labour income, as well as raw material and energy costs. The latter two types of costs included purchases of inputs from all primary industries, as well as from the following industries: paper and allied products, wood products, primary metals, non-metallic mineral products, chemicals, petroleum and coal products, electric power, gas distribution and pipelines. Normal output was a three-year moving average of gross output (measured in 1971 dollars). Normalized unit costs were defined as the ratio of costs to normal output.

Data on export orientation and import penetration were also taken from the above input-output database. Export orientation was defined as the ratio of exports (including re-exports) to gross output. Import penetration was defined as the ratio of imports to domestic sales, where domestic sales was the sum of gross output (excluding exports) and imports. In both cases, both the numerator and denominator were measured in 1971 dollars.

Measures of capacity utilization rates were constructed at the Bank of Canada, using various methods. For some industries, net output series were constructed from the input-output database (defined as the difference between gross output and purchases of inputs from other industries). For other industries, net output data were taken from the gross domestic product database supplied by Statistics Canada. These data are described in Statistics Canada, Gross Domestic Product by Industry (61-213) and Real Domestic Product by Industry, 1961-1971 1961=100 (61-516); in some cases, unpublished data were used. Data on mid-year net capital stocks were also employed, using Statistics Canada, Fixed Capital Flows and Stocks (13-211) and unpublished data supplied by Statistics Canada. For industries where capital stock data were available, ratios of the capital stock to net output were used to construct capacity utilization rates, using the methods described in Schaefer (1980). For other industries, net output data were used to calculate capacity utilization rates, again using methods described in Schaefer (1980).

Data on four-firm concentration ratios were taken from Statistics Canada (1983). Data were not available before 1965 (or at a later date

for certain industries) and the concentration ratio was assumed to be the same as in 1965 (or in the first available year after that). After 1965, data were only published for 1968, 1970, 1972, 1974, 1976, 1978 and 1980. Data for missing years were constructed by linear interpolation.

Appendix 2

Classification of Manufacturing Industries by Average Four-Firm Concentration Ratio Level

Low Concentration (Less Than 40%)	Medium Concentration (40%-59.9%)	High Concentration (More than 60%)
Poultry Processors	Slaughtering and Meat Processors	Flour and Breakfast Cereals Industries
Fish Products Industry	Confectionary Mfgrs.	Sugar Refineries
Misc. Food Industries	Leather Glove Factories	Vegetable Oil Mills
Other Rubber Industries	Wool Yarn & Cloth Mills	Wineries
Other Plastic Fabricators	Narrow Fabric Mills	Leaf Tobacco Processing
Shoe Factories	Carpet Mat & Rug Ind.	Tobacco Products Mfgrs.
Small Leather Goods Mfgrs.	Misc. Textile Ind.	Rubber Footwear Mfgrs.
Canvas Products Industry	Veneer & Plywood Mills	Tire & Tube Mfgrs.
Hosiery Mills	Coffin & Casket Ind.	Leather Tanneries
Other Knitting Mills	Household Furniture Ind.	Cotton Yarn & Cloth Mills
Clothing Industries	Office Furniture Ind.	Synthetic Textile Mills
Sawmills	Paper Box & Bag Mfgrs.	Thread Mills
Household Furniture Ind.	Iron Foundries	Cordage & Twine Ind.
Other Furniture Ind.	Other Metal Casting & Extruding	Pressed & Punched Felt Mills
Electric Lamp & Shade Ind.	Wire & Wire Products Mfgrs.	Asphalt & Related Products
Pulp & Paper Industry	Comm. Refrig. & Air Cond. Mfgrs.	Iron & Steel Industry
Other Paper Converters	Truck Body & Trailer Mfgrs.	Steel Pipe & Tube Mills
Ornamental & Arch. Metal Ind.	Motor Vehicle Parts	Aluminum Smelting & Refining
Hardware Tool & Cutlery Mfgrs.	Small Electrical Appliances	Other Smelting & Refining
Heating Equipment Mfgrs.	Radio & Television Receivers	Aluminum Rolling & Extruding
Misc. Metal Fabricating Ind.	Communications Equip. Mfgrs.	Agricultural Implement Ind.
Misc. Machinery & Equip. Mfgrs.	Mfgrs. of Elect. Ind. Equip	Office & Store Machinery Mfgrs.
Concrete Products Mfgrs.	Cement Mfgrs.	Aircraft & Parts Mfgrs.
Stone Products Mfgrs.	Clay Products Mfgrs.	Misc. Transp. Equip. Ind.
Mfgrs. of Pharm. & Medicines	Other Non-Metallic Products Ind.	Major Appliances Electrical & Non-Electrical
Paint & Varnish Mfgrs.	Other Petrol. & Coal Prod. Ind.	Battery Mfgrs.
Other Chemical Industries	Mfgrs. of Plastics & Synthetic Resins	Mfgrs. of Electric Wire & Cable
Jewellery & Silverware Mfgrs.	Mfgrs. of Toilet Preparations	Cement Mfgrs.
	Mfgrs. of Industrial Chemicals	Refractories Mfgrs.
	Scient. & Prof. Equip. Mfgrs.	Glass & Glass Products Mfgrs.
	Broom, Brush & Mop Ind.	Abrasives Mfgrs.
	Sporting Goods & Toy Ind.	Petroleum Refineries
	Linoleum & Coated Fabrics Ind.	Mfgrs. of Mixed Fertilizers
	Other Misc. Manufacturing Ind.	Mfgrs. of Soap & Cleaning Compounds

Table 1

Concentration of Non-financial Enterprises (in %)

	By Sales			By Assets			By Equity			By Profits		
	Top 25	Top 100	Top 500	Top 25	Top 100	Top 500	Top 25	Top 100	Top 500	Top 25	Top 100	Top 500
75	20.8	36.0	53.1	29.2	46.5	65.0	27.4	47.2	67.7	22.2	43.1	65.6
76	21.0	36.3	53.0	29.6	46.9	64.5	27.1	46.8	66.7	24.2	43.4	64.1
77	21.4	36.9	53.5	29.4	47.6	65.3	26.6	48.0	67.8	25.3	45.8	66.6
78	21.3	36.6	52.9	30.4	47.8	65.1	30.5	50.3	69.5	27.3	47.4	65.9
79	21.2	37.4	53.9	30.7	48.5	65.4	31.1	51.8	70.2	28.0	48.0	66.9
80	20.9	37.0	53.2	30.2	49.2	65.1	30.7	53.2	70.4	26.1	51.7	68.8

Source: Statistics Canada, Corporations and Labour Unions Returns Act. Part I, Corporations (61-210).

Table 2

Sales Concentration Ratios for 33 Major Industries

	1980	1979	1978	1977	1976	1975
Tobacco Prods.	90.9	89.0	91.0	91.3	92.2	88.1
Petroleum & Coal Prods.	64.3	66.5	72.3	74.8	74.3	75.4
Transport Equip.	64.9	67.4	71.6	71.0	69.2	70.1
Communication	69.4	70.0	68.3	67.2	67.2	72.4
Storage	60.9	60.3	59.3	55.4	61.3	56.1
Primary Metals	58.8	57.9	60.8	60.0	58.5	58.3
Rubber Products	58.4	59.0	59.5	60.1	60.8	63.1
Metal Mining	50.3	49.9	48.8	48.6	49.9	47.4
Transportation	48.9	49.0	47.6	48.6	48.3	41.4
Public Utilities	56.1	56.7	47.6	47.7	49.0	46.3
Beverages	42.8	40.8	41.9	43.5	41.7	44.4
Textile Mills	39.9	38.9	39.2	38.8	35.3	36.1
Mineral Fuels	32.1	36.3	37.7	35.0	38.1	44.5
Paper and Allied	31.5	36.5	31.5	34.4	34.9	35.0
Non-metallic Mineral Prods.	31.3	30.0	32.8	31.0	29.7	27.2
Electrical Prods.	33.1	34.3	32.5	37.0	37.9	39.3
Chemicals & Chemical Prods.	25.1	26.3	24.6	25.2	25.3	25.5
Machinery	25.1	29.5	27.4	28.3	28.1	28.8
Other Mining	20.0	22.9	23.4	24.5	25.3	27.4
Wood Industries	18.2	18.8	21.7	22.5	22.9	22.0
Printing, Publishing & Allied Inds.	22.1	19.8	19.7	19.1	21.0	21.9
Food	18.6	18.5	19.1	19.6	19.2	19.9
Knitting Mills	16.3	16.4	16.4	16.5	15.4	16.2
Leather Prods.	17.7	17.1	15.0	17.8	15.9	17.3
Miscellaneous Manufacturing	24.0	20.0	14.1	14.1	13.6	13.9
Retail Trade	12.5	12.6	12.6	12.7	12.6	12.9
Metal Fabricating	11.8	13.2	13.2	13.2	13.1	14.2
Furniture Industries	14.0	16.3	15.9	11.3	12.5	12.3
Clothing Industries	9.0	8.8	8.6	8.8	6.5	6.1
Services	8.7	8.6	8.9	9.2	8.8	8.2
Wholesale Trade	8.7	7.4	7.6	9.3	9.2	9.0
Agriculture, Forestry & Fishing	5.8	5.9	5.4	5.1	5.7	5.2
Construction	2.8	3.3	3.2	4.3	5.5	5.9

Table 3

Classification of Selected Manufacturing Industries According to Concentration Ratios
(% of total manufacturing production in 1981 in brackets)

Low (0%-39.9%)	Medium (40%-59.9%)	High (60%-100%)
Knitting Mills (0.8)	Meat and poultry products (2.0)	Distilleries (1.0)
Men's Clothing (1.1)	Soft drinks (0.8)	Iron and steel mills (3.8)
Women's Clothing (1.3)	Veneer and plywood mills (0.5)	Smelting and refining (2.2)
Sawmills, planing mills and shingle mills (2.7)	Paper box and bag (1.2)	Aircraft and aircraft parts (1.9)
Sash, door and other millwork plants (1.0)	Publishing and printing (3.2)	Motor vehicles and parts (8.1)
Household furniture (1.0)	Iron foundries (0.4)	Major appliances (0.6)
Commercial printing; platemaking, typesetting and trade bindery (2.9)	Metal stamping, pressing and coating (1.9)	Household radios and televisions (0.5)
Hardware, tool and cutlery (1.0)	Wire and wire products (0.9)	Petroleum refineries (1.0)
Machinery (6.6)	Communications equipment (2.5)	Soap and cleaning compounds (0.7)
Dairy products (1.4)	Electrical Industrial equipment (1.5)	Breweries (1.4)
Fruit and vegetable processing (0.8)	Concrete products (0.5)	Cotton yarn and cloth (0.4)
Bakery products (1.0)	Ready-mix concrete (0.5)	Cement (0.5)
Miscellaneous food (2.5)	Industrial chemicals (1.9)	
Pulp and paper (5.4)	Scientific and professional equipment (1.2)	
Truck body and trailers (0.5)	Man-made fibre, yarn and cloth (1.7)	
Pharmaceuticals and medicines (1.3)		
Paint and varnish (0.5)		
Miscellaneous chemicals (1.1)		
Total Share of Manufacturing Output in 1981(%): 32.9	20.7	22.1

Table 4

Inflation Rates for Various Manufacturing Industry Groupings (%)

	Total manufacturing	Low concentration	Medium concentration	High concentration
1972	4.4	4.8	4.8	2.6
1973	11.2	10.8	7.8	6.2
1974	19.0	18.4	16.4	16.2
1975	11.2	11.9	13.3	11.9
1976	5.1	5.8	5.7	6.1
1977	7.9	8.8	5.0	9.6
1978	9.2	7.9	9.3	9.9
1979	14.5	12.7	11.0	12.9
1980	13.5	9.3	11.4	18.4
1981	10.2	9.3	11.2	10.6
1982	6.0	5.4	6.8	0.1

Table 5

Cross-Sectional Price Inflation Regressions in Manufacturing Sector (t-statistic in brackets)

	Aggregate capacity utilization rate: manufacturing	Constant	Normalized unit posts	Excess demand proxy	Relative concentration ratio	$\overline{R}^2$
1964	93.3	0.868 (2.9)	.201 (4.3)	-.076(-2.7)	-.019(-1.6)	.203
1965	95.4	1.864 (3.8)	.234 (3.2)	-.083(-1.6)	-.004(-0.2)	.071
1966	94.8	2.438 (4.4)	.423 (5.9)	-.119(-2.3)	.000 (0.0)	.254
1967	90.4	2.255 (5.7)	.129 (2.7)	-.096(-2.4)	-.004(-0.2)	.091
1968	90.5	1.496 (3.8)	.111 (1.8)	-.050(-1.2)	-.013(-0.8)	.015
1969	92.7	2.696 (6.6)	.140 (3.0)	-.128(-3.8)	.003 (0.2)	.157
1970	86.7	2.497 (7.1)	.113 (2.3)	-.068(-2.1)	.013 (0.9)	.052
1971	87.1	2.326 (5.5)	.062 (1.3)	-.024(-0.6)	-.003(-0.2)	-.008
1972	90.2	2.341 (3.4)	.255 (4.2)	-.099(-2.2)	-.012(-0.6)	.138
1973	95.6	4.757 (5.0)	.482 (8.2)	-.033(-0.5)	-.033(-1.3)	.393
1974	94.3	6.584 (4.1)	.740(10.2)	-.189(-2.1)	.039 (0.9)	.468
1975	84.8	9.366(12.3)	.263 (4.6)	-.036(-0.6)	.014 (0.5)	.138
1976	87.0	4.029 (4.8)	.160 (2.9)	-.055(-0.9)	-.017(-0.7)	.053
1977	86.4	5.387 (9.8)	.152 (3.4)	-.092(-2.4)	-.001(-0.0)	.111
1978	88.6	6.712(11.7)	.157 (3.8)	-.063(-1.7)	-.013(-0.7)	.111
1979	91.5	9.923 (9.1)	.273 (4.5)	-.147(-3.4)	.009 (0.3)	.232

Number of observations: 122 (unweighted)

Ordinary least squares

Table 6

Cross-Sectional Price Inflation Regressions in Manufacturing Sector
(t-statistic in brackets)

	Low concentration				Medium concentration				High concentration			
	Constant	Normalized unit costs	Excess demand proxy	$\bar{R}^2$	Constant	Normalized unit costs	Excess demand proxy	$\bar{R}^2$	Constant	Normalized unit costs	Excess demand proxy	$\bar{R}^2$
1964	.393 (0.5)	.322 (1.5)	.040 (0.5)	.014	1.143 (2.6)	.162 (2.9)	-.008(-0.2)	.175	-.056(-0.1)	.326 (3.2)	-.123(-2.1)	.295
1965	1.865 (5.8)	.121 (1.8)	-.044(-1.3)	.103	1.326 (2.2)	.191 (3.0)	-.001(-0.0)	.190	3.041 (2.1)	.398 (2.0)	-.131(-1.0)	.070
1966	2.479 (6.4)	.205 (2.2)	-.081(-2.2)	.160	2.534 (1.7)	.481 (2.3)	-.057(-0.4)	.117	2.590 (2.3)	.527 (4.3)	-.266(-2.8)	.421
1967	2.235 (4.5)	-.008(-0.1)	-.083(-1.5)	.019	1.496 (1.5)	.011 (0.1)	-.041(-0.4)	-.059	2.386 (2.5)	.125 (1.6)	-.173(-2.1)	.218
1968	.665 (0.6)	.542 (2.5)	-.025(-0.3)	.160	1.798 (2.3)	.164 (1.0)	-.015(-0.2)	-.029	.326 (0.4)	.020 (0.2)	-.036(-0.4)	-.059
1969	2.062 (1.9)	.276 (1.4)	-.137(-1.7)	.180	1.991 (2.8)	.210 (2.1)	.005 (0.1)	.064	3.172 (3.4)	.093 (1.1)	-.230(-3.1)	.206
1970	2.365 (4.0)	.333 (2.9)	-.090(-1.9)	.270	2.021 (2.4)	-.040(-0.3)	-.013(-0.1)	-.059	3.553 (4.3)	.089 (1.1)	-.033(-0.5)	-.020
1971	2.841 (6.2)	-.010(-0.2)	.068 (1.4)	-.006	1.556 (1.7)	.260 (2.2)	-.007(-0.1)	.085	1.499 (1.5)	-.029(-0.3)	-.051(-0.6)	-.047
1972	2.091 (1.6)	.289 (2.9)	.012 (0.1)	.189	.554 (0.4)	.557 (4.2)	-.132(-1.6)	.379	3.093 (1.8)	.116 (0.8)	-.126(-1.3)	.012
1973	1.449 (1.1)	.760 (8.4)	.104 (0.8)	.725	6.657 (3.9)	.466 (3.7)	-.220(-2.0)	.424	6.589 (3.5)	.216 (1.7)	-.100(-0.8)	.103
1974	5.884 (2.2)	.772 (5.6)	-.052(-0.4)	.585	3.432 (1.6)	1.014(10.1)	-.179(-1.3)	.757	6.800 (1.5)	.725 (4.8)	-.230(-1.0)	.396
1975	14.052 (7.3)	-.217(-1.3)	.198 (1.7)	.035	9.369 (6.4)	.044 (0.3)	-.114(-0.9)	-.035	10.462 (6.5)	.263 (2.7)	-.012(-0.1)	.142
1976	3.444 (4.1)	.257 (5.0)	.173 (2.3)	.465	5.730 (5.7)	-.002(-0.0)	-.068(-0.9)	-.034	2.103 (0.8)	.296 (1.8)	-.169(-1.0)	.051
1977	4.543 (5.5)	.324 (3.0)	-.065(-0.9)	.265	5.820 (5.5)	.026 (0.3)	-.063(-1.0)	-.023	4.524 (3.2)	.204 (2.7)	-.085(-0.9)	.156
1978	5.862 (3.3)	.388 (2.4)	-.234(-2.2)	.414	6.373 (5.2)	.237 (2.8)	-.051(-0.7)	.150	5.694 (5.1)	.140 (2.1)	.017 (0.2)	.066
1979	5.318 (2.1)	.600 (4.3)	-.123(-1.3)	.635	12.119 (7.1)	.034 (0.3)	-.082(-1.2)	-.004	9.786 (4.4)	.398 (3.2)	-.212(-2.6)	.341
Average coefficient	3.597	.310	-.022		3.995	.238	-.065		4.098	.244	-.123	
Number of observations (unweighted)	29				34				34			

Ordinary least squares

Table 7

Relationship between Concentration Ratio and Expansion/Contraction Amplitude of Profit Margins

Regression Coefficient of Concentration Ratio Variable (t-statistic in bracket)

Business cycle	Expansion amplitude	Contraction amplitude
1962-1968	-.26 (-0.4)	.30 (0.6)
1968-1970	-1.09 (-1.2)	-.05 (-.04)
1970-1975	-1.34 (-0.8)	.70 (0.7)
1975-1982	-.52 (-0.3)	.38 (0.1)

Number of observations: 15 industries.

Table 8

Average Cycle Amplitudes, Profit Rates on Sales

	Expansion Amplitude Concentration Ratio			Contraction Amplitude Concentration Ratio		
Cycle	Less than 40	40-60	More than 60	Less than 40	40-60	More than 60
1962-1968	79.4	69.0	99.0	-58.7	-54.7	-31.0
1968-1970	86.9	54.6	38.7	-80.5	-115.0	-45.1
1970-1975	113.7	112.3	42.8	-83.1	-91.5	-28.1
1975-1982	111.1	125.4	61.1	-163.4	-170.6	-268.0

Table 9

Profit Margin Regressions: Manufacturing Industries (t-statistic in brackets)

	Constant	Excess demand proxy	Relative concentration ratio	Lagged profit margins	$\bar{R}^2$
1962	.027 (5.1)	.00027 (1.0)	-.00009 (-0.8)	.902 (22.8)	.815
1963	.014 (2.7)	.00062 (2.3)	.00003 (0.2)	.889 (24.5)	.839
1964	.011 (2.3)	.00039 (1.6)	.00016 (1.5)	.943 (27.9)	.873
1965	.021 (4.0)	.00035 (1.1)	.00023 (2.1)	.853 (24.1)	.846
1966	-.000 (0.0)	.00068 (2.5)	-.00015 (-1.4)	.920 (25.8)	.864
1967	.005 (1.0)	.00098 (4.1)	-.00002 (-0.2)	.876 (25.2)	.851
1968	.011 (2.9)	.00008 (0.4)	-.00008 (-1.0)	.959 (34.0)	.908
1969	.018 (3.6)	.00061 (2.4)	.00020 (1.9)	.869 (24.2)	.838
1970	.002 (0.4)	.00077 (3.5)	-.00002 (-0.2)	.906 (25.1)	.849
1971	.033 (5.7)	.00082 (2.6)	.00003 (0.2)	.819 (18.7)	.754
1972	.008 (1.6)	.00045 (2.0)	-.00014 (-1.3)	.911 (24.5)	.837
1973	.015 (2.7)	.00056 (2.2)	-.00014 (-1.3)	.885 (21.8)	.812
1974	.021 (3.6)	.00105 (4.2)	.00008 (0.7)	.765 (18.9)	.764
1975	.021 (3.9)	.00128 (5.7)	-.00012 (-1.2)	.830 (21.4)	.799
1976	.004 (0.7)	.00065 (2.3)	-.00022 (-2.0)	.925 (19.9)	.771
1977	.030 (4.8)	.00114 (4.3)	.00015 (1.2)	.798 (16.0)	.694
1978	.019 (2.6)	.00005 (0.2)	-.00006 (-0.4)	.897 (15.9)	.676
1979	.023 (4.3)	.00071 (3.9)	-.00004 (-0.4)	.798 (20.4)	.777

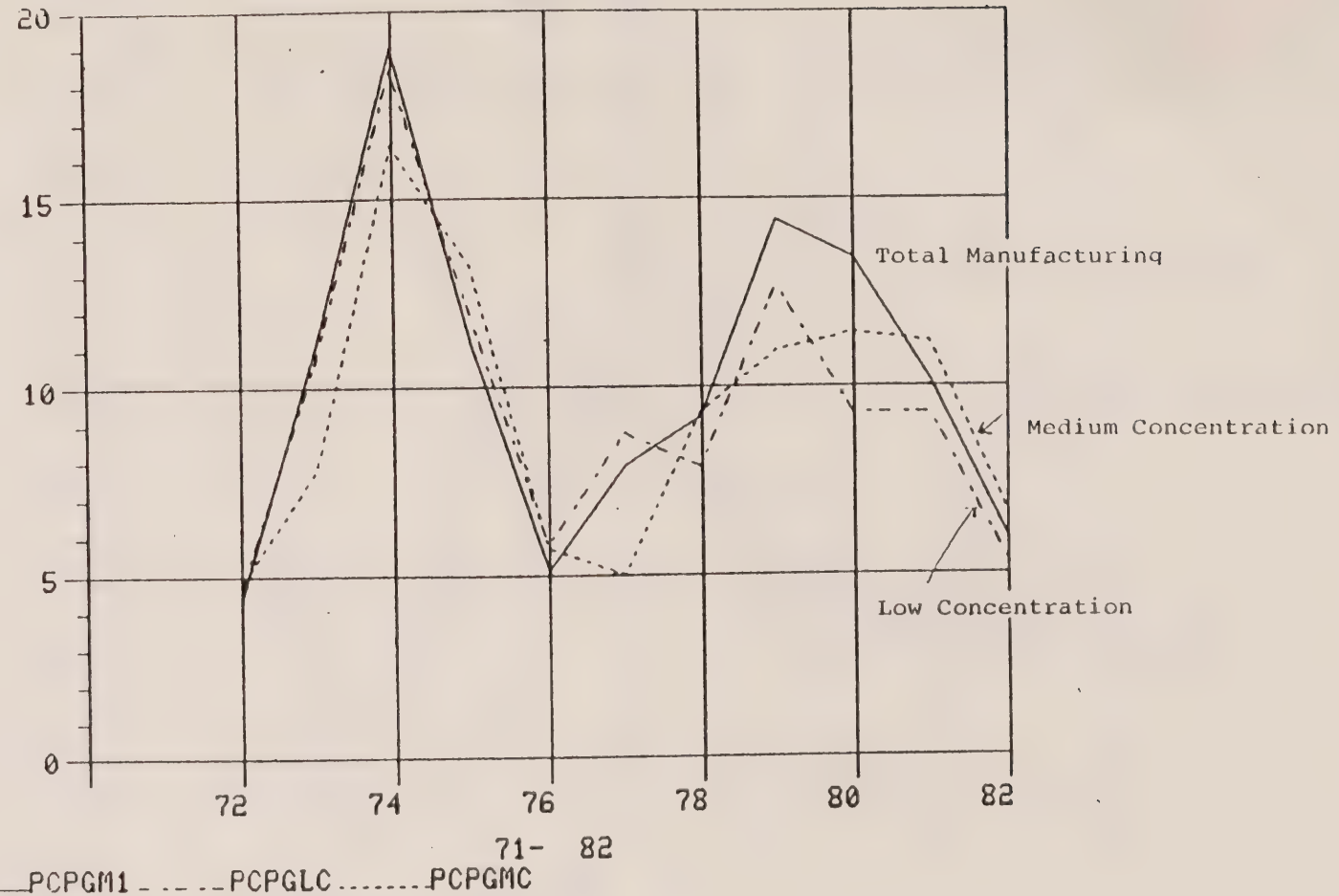
Number of Observations 122

Ordinary least squares

CHART 1

Inflation Rates for Selected Manufacturing Industry Groupings (%)

Part 1

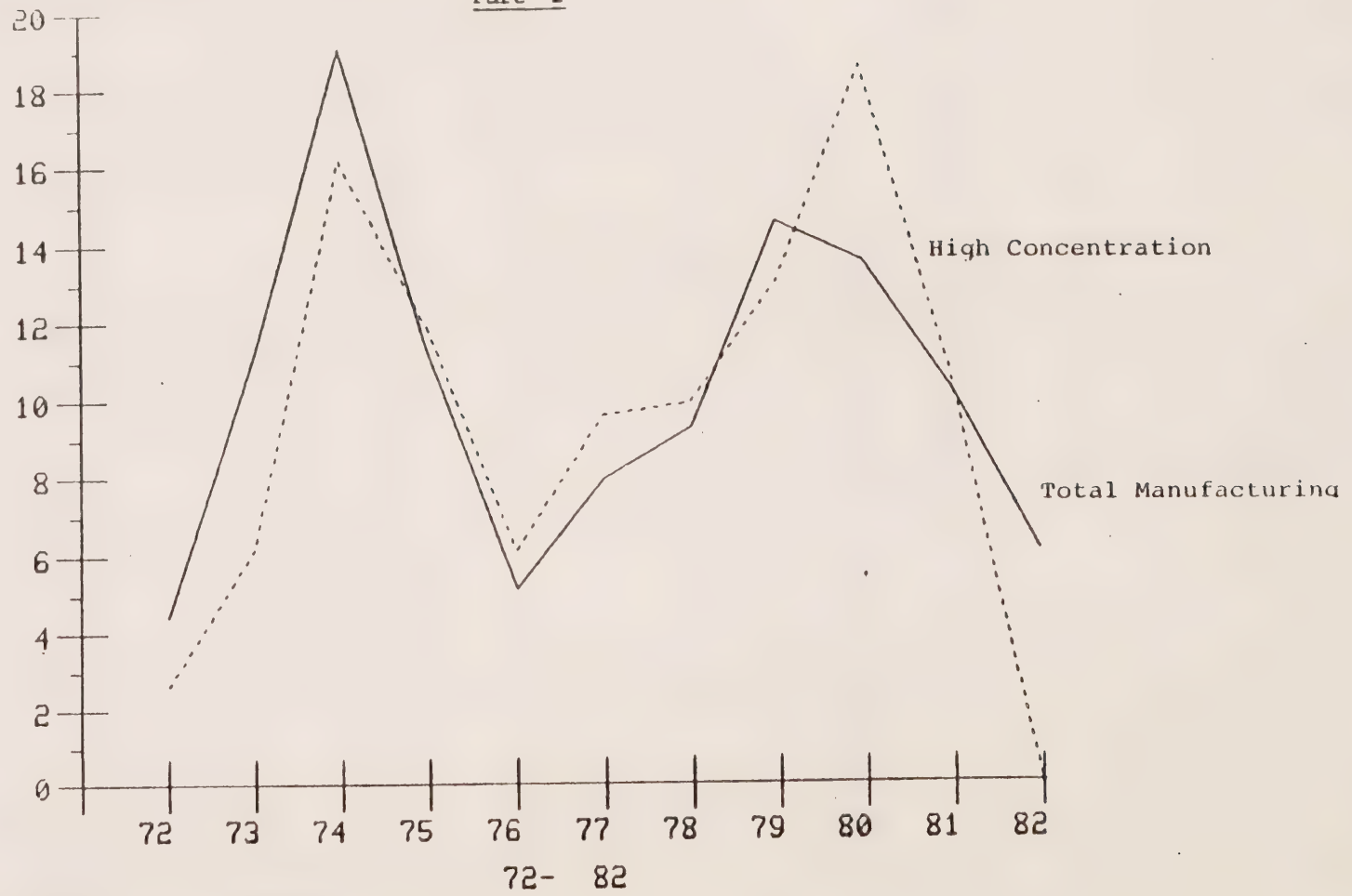


PCPGM1 - Total Manufacturing
PCPGLC - Low Concentration
PCPGMC - Medium Concentration

CHART 2

Inflation Rates for Selected Manufacturing Industry Groupings (%)

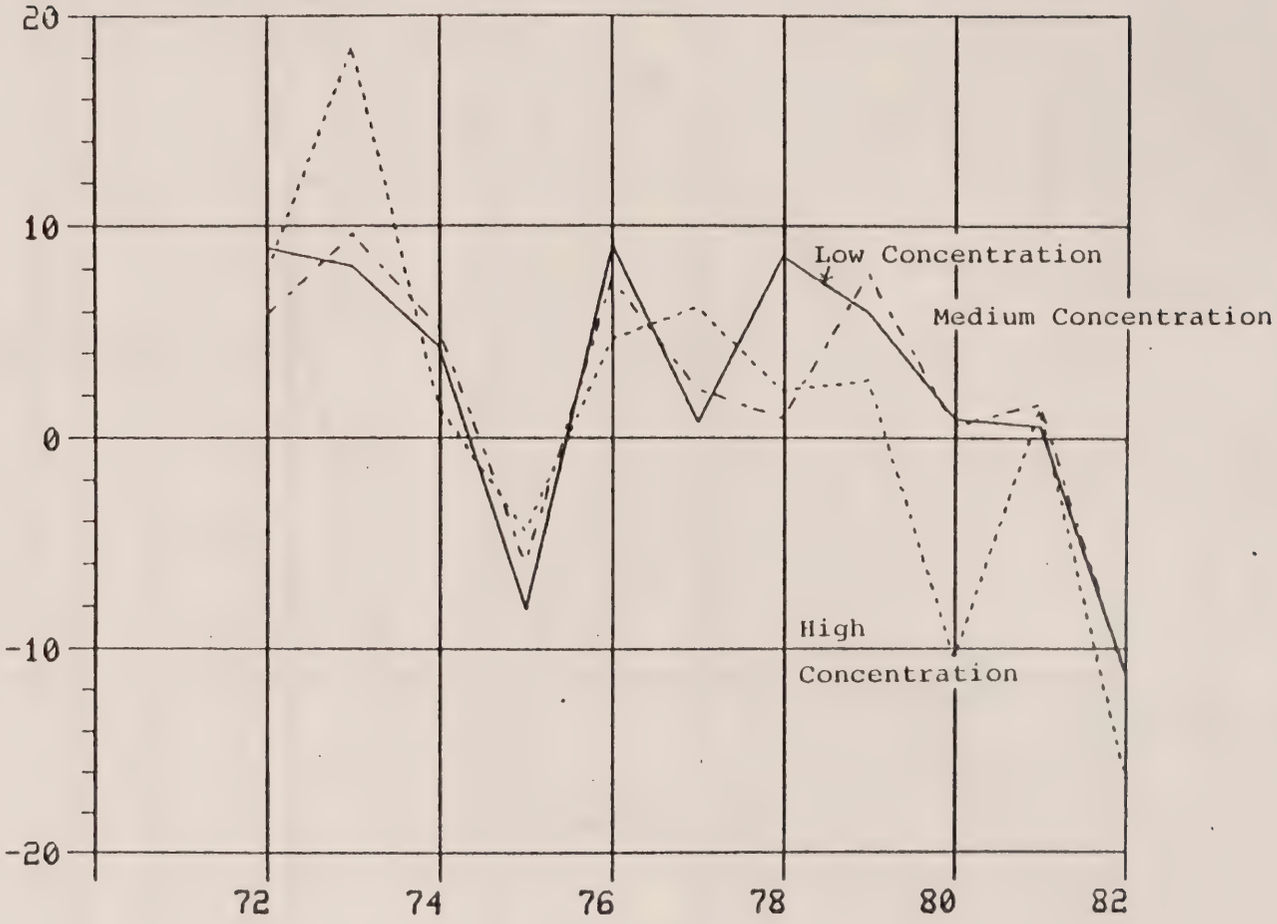
Part 2



PCPGM1 - Total Manufacturing
PCPGHC - High Concentration

CHART 3

Output Changes (%) for Selected Industry Groupings



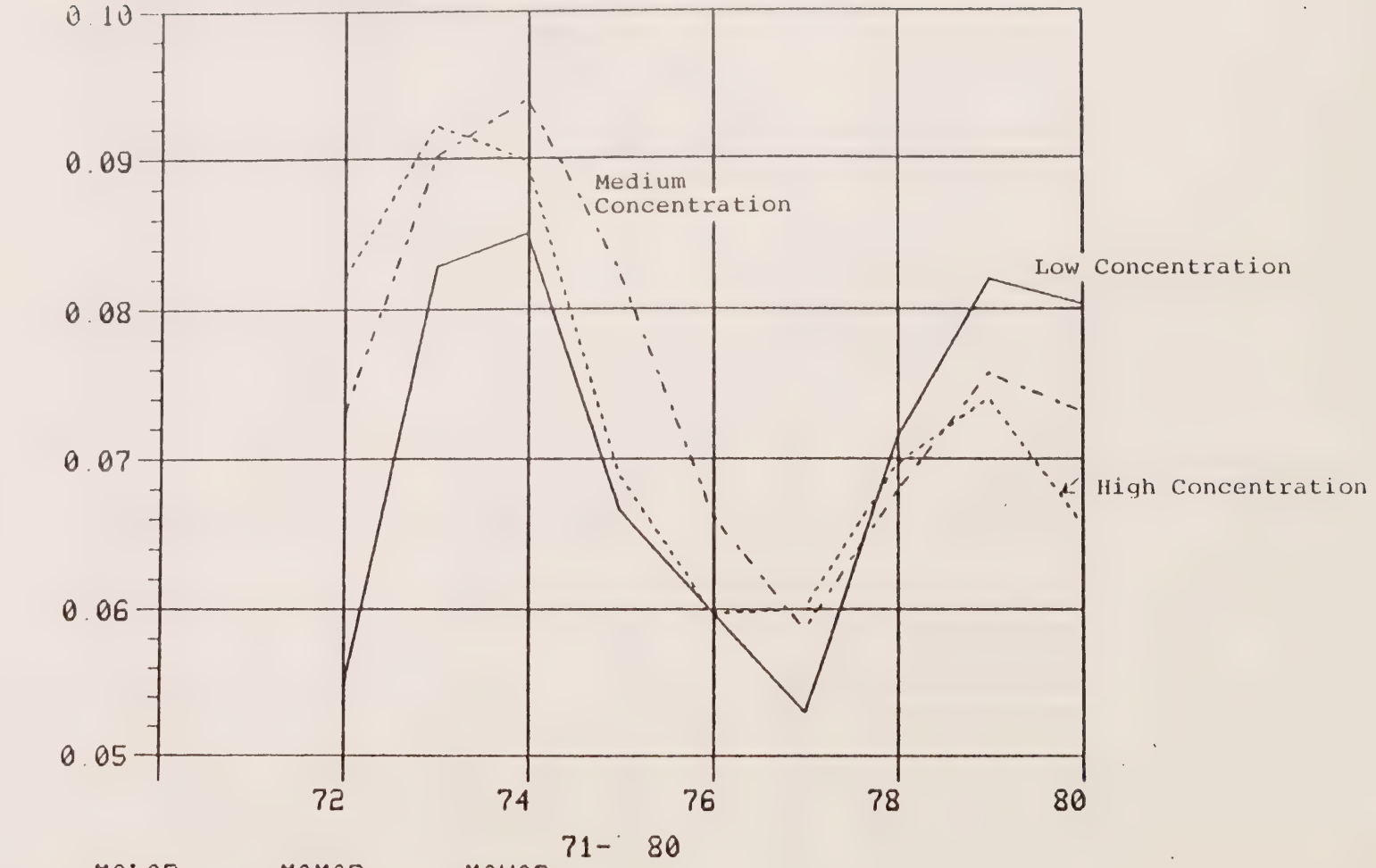
71- 82

PCQNLC PCQNMC PCQNHC

PCQNLC - Low Concentration
PCQNMC - Medium Concentration
PCQNHC - High Concentration

CHART 4

Profit Margins for Selected Industry Groupings



MGLCR - Low Concentration
MGMCR - Medium Concentration
MGHCR - High Concentration

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